

# **GEOLOGIC NOTES**

**DIVISION OF GEOLOGY  
STATE DEVELOPMENT BOARD  
COLUMBIA, S. C.**

**JANUARY - FEBRUARY 1962**



**Vol. 6**

**No. 1**

# GEOLOGIC NOTES

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# GEOLOGIC ACTIVITIES IN SOUTH CAROLINA DURING 1961

By

H. S. JOHNSON, JR.<sup>1/</sup>

DURING 1961 THE DIVISION OF GEOLOGY, SOUTH CAROLINA STATE DEVELOPMENT BOARD, CONTINUED ITS BASIC INVESTIGATIONS OF THE GEOLOGY AND MINERAL RESOURCES OF THE STATE. THE STAFF CONSISTS OF ONE FULL TIME GEOLOGIST, ONE GEOLOGIC SECRETARY, A CERAMIC CONSULTANT, AND EIGHT PART TIME PROJECT GEOLOGISTS AND GEOLOGIC ASSISTANTS.

ACCORDING TO A PRELIMINARY STATEMENT ISSUED BY THE U. S. BUREAU OF MINES, MINERAL PRODUCTION IN SOUTH CAROLINA IN 1961 TOTALLED ABOUT \$30,843,000, AN INCREASE OF NEARLY 3 PERCENT OVER THE PRECEDING YEAR. THE PRINCIPAL MINERAL INDUSTRIES WERE THE MANUFACTURING OF CEMENT AND THE PRODUCTION OF CRUSHED STONE, CLAYS, SAND AND GRAVEL, AND VERMICULITE. TOTAL CEMENT SHIPMENTS INCREASED CONSIDERABLY, THERE BEING A 42 PERCENT INCREASE IN OUTPUT OF MASONRY CEMENT AND AN 8 PERCENT INCREASE IN OUTPUT OF PORTLAND CEMENT. TOTAL CLAY PRODUCTION INCREASED 4 PERCENT OVER 1960. TOTAL STONE PRODUCTION INCREASED 2 PERCENT. SAND AND GRAVEL PRODUCTION DECREASED 5 PERCENT IN TONNAGE, CONTINUING A TREND BEGUN IN THE PREVIOUS YEAR. VERMICULITE PRODUCTION SHOWED INCREASES IN BOTH TONNAGE AND VALUE, INDICATING ANOTHER RECORD YEAR FOR THIS COMMODITY. SHEET MICA OUTPUT DECLINED FOR THE THIRD CONSECUTIVE YEAR. SCRAP MICA PRODUCTION INCREASED SLIGHTLY IN TONNAGE BUT DECREASED IN VALUE. KYANITE OUTPUT DECREASED SLIGHTLY BUT BY-PRODUCT PYRITE SHOWED AN INCREASE OVER THE PREVIOUS YEAR. BARITE PRODUCTION INCREASED APPRECIABLY. FELDSPAR, RECOVERED FROM GRANITE SCREENINGS, SHOWED NO APPRECIABLE CHANGE. PEAT PRODUCTION SHOWED AN INCREASE.

## PROJECTS

THE FOLLOWING REMARKS SERVE AS AN INDEX TO PROJECTS CARRIED ON DURING 1961 BY THE DIVISION OF GEOLOGY OR WITH ITS COOPERATION AND SUPPORT.

LIMESTONE RESOURCES OF THE COASTAL PLAIN OF SOUTH CAROLINA (S. D. HERON, JR.). -- THIS COMPREHENSIVE REPORT ON LIMESTONE RESOURCES IS UNDERGOING TECHNICAL CRITICISM AND FINAL EDITING PRIOR TO PUBLICATION AS A BULLETIN OF THE STATE DEVELOPMENT BOARD.

MINERALS INDUSTRY OF SOUTH CAROLINA (MRS. CAMILLA McCAULEY). -- PART TIME LIBRARY RESEARCH IS CONTINUING IN ORDER TO ASSEMBLE ALL AVAILABLE INFORMATION ON THE MINERAL INDUSTRY OF SOUTH CAROLINA FROM THE COLONIAL PERIOD TO THE PRESENT. COMMODITY CHAPTERS ARE TO BE PUBLISHED SEPARATELY IN THE BULLETIN SERIES AS BULL. 27-A, 27-B, ETC.

<sup>1/</sup> STATE GEOLOGIST, DIVISION OF GEOLOGY, S. C. STATE DEVELOPMENT BOARD

GEOLOGY AND MINERAL RESOURCES OF EDGEFIELD COUNTY, S. C. (W. T. McCUTCHEN AND H. S. JOHNSON, JR.). -- FIELD WORK ESSENTIALLY COMPLETE. REPORT IN PREPARATION.

GEOLOGY AND MINERAL RESOURCES OF PICKENS COUNTY, S. C. (C. Q. BROWN). -- FIELD WORK ESSENTIALLY COMPLETE. REPORT IN PREPARATION.

GEOLOGY AND MINERAL RESOURCES OF NEWBERRY COUNTY, S. C. (J. F. McCAULEY). -- FIELD WORK COMPLETE. REPORT IN PREPARATION.

GEOLOGY AND MINERAL RESOURCES OF ORANGEBURG COUNTY, S. C. (W. K. PODSER). -- FIELD WORK COMPLETE. REPORT IN PREPARATION.

GEOLOGY AND MINERAL RESOURCES OF YORK COUNTY, S. C. (J. R. BUTLER). -- FIELD WORK IN PROGRESS ON PART TIME BASIS.

FULLERS EARTH DEPOSITS OF SOUTH CAROLINA (G. C. ROBINSON AND S. D. HERON, JR.). -- LABORATORY INVESTIGATIONS IN PROGRESS.

GEOLOGY OF THE FORT JACKSON NORTH QUADRANGLE, S. C. (W. K. PODSER AND H. S. JOHNSON, JR.). -- PUBLISHED AS MS-3 AND AVAILABLE TO THE PUBLIC AT 25¢ PER COPY.

GEOLOGY OF THE BLANEY QUADRANGLE, S. C. (D. C. RIDGEWAY AND J. F. McCAULEY). -- MAP AND TEXT UNDERGOING AUTHOR REVISION.

GEOLOGY OF THE IRMO N. E. QUADRANGLE, S. C. (W. E. BRIGHT). -- FIELD WORK ESSENTIALLY COMPLETE. REPORT IN PREPARATION.

GEOLOGY OF THE BLYTHEWOOD QUADRANGLE, S. C. (W. D. PARADESES). -- FIELD WORK COMPLETE. MAP AND REPORT IN PREPARATION.

BENTONITIC CLAYS OF THE COASTAL PLAIN OF SOUTH CAROLINA (S. D. HERON, JR. AND G. C. ROBINSON). -- LABORATORY INVESTIGATIONS IN PROGRESS.

DEPTH TO COOPER MARL IN THE LADSON QUADRANGLE, S. C. (D. J. COLQUHOUN). -- FIELD WORK COMPLETE. FINAL MAP AND TEXT IN PREPARATION.

WACCAMAW AND CROATAN DEPOSITS OF THE CAROLINAS (JULES DU BAR). -- FIELD WORK CONTINUED DURING THE SUMMER. ADDITIONAL DRILLING BROUGHT THE TOTAL POWER AUGER HOLES IN Horry COUNTY TO 36. LABORATORY WORK AND REPORT PREPARATION ARE CONTINUING AT THE UNIVERSITY OF HOUSTON.

GEOLOGY AND MINERAL RESOURCES OF OCONEE COUNTY, S. C.  
(C. J. CAZEAU). -- FIELD AND LABORATORY WORK IN PROGRESS.  
PRELIMINARY REPORT PUBLISHED IN NOVEMBER-DECEMBER 1961 ISSUE  
OF GEOLOGIC NOTES.

GEOCHEMICAL PROSPECTING PROGRAM. -- AS A PART OF  
EACH COUNTY PROJECT SAMPLES OF ALLUVIAL CLAY ARE BEING COLLECT-  
ED FROM SMALL STREAMS FOR SPECTROGRAPHIC ANALYSES WITH EM-  
PHASIS ON CERTAIN KEY ELEMENTS. LABORATORY WORK IS BEING  
DIRECTED BY PROFESSOR C. Q. BROWN, DEPARTMENT OF GEOLOGY,  
CLEMSON COLLEGE.

PROVISIONAL GEOLOGIC MAP OF THE CRYSTALLINE ROCKS  
OF SOUTH CAROLINA (W. C. OVERSTREET AND HENRY BELL III). --  
BEDROCK GEOLOGY HAS BEEN INFERRED FROM COUNTY SOIL MAPS AND  
FROM ALL AVAILABLE SOURCES OF GEOLOGIC INFORMATION. NOW ON  
OPEN FILE IN ONE COLOR EDITION.

### SHORTER INVESTIGATIONS

WINNSBORO BLUE GRANITE. -- SEVERAL POTENTIAL QUARRY  
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SOURCES OF MONUMENTAL STONE COULD BE DEVELOPED IN THIS AREA.

DRILLING, DURHAM TRACT, COLLETON COUNTY. -- SEVERAL  
DAYS RECONNAISSANCE, INCLUDING POWER AUGER DRILLING, INDICATE  
THAT SINK HOLES IN THIS AREA ARE YOUNGER THAN AND HAVE NO  
GENETIC RELATION TO CAROLINA BAYS IN THE AREA. A POTENTIALLY  
ECONOMIC BED OF MONTMORILLONITIC CLAY IS PRESENT ON THE PRO-  
PERTY.

WIDOMICO BAR NEAR DORCHESTER. -- SEVERAL DRILL HOLES  
INDICATE A VERY EXTENSIVE SAND DEPOSIT IN THIS AREA. THIS  
SAND IS PREDOMINANTLY FINE- TO VERY FINE-GRAIN, AND IN SOME  
PLACES THE HEAVY MINERAL CONTENT IS THOUGHT TO APPROACH 3 TO  
5%.

LIMESTONE NEAR WARE SHOALS, LAURENS COUNTY. -- BRIEF  
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SOME EXPLORATION MAY BE JUSTIFIABLE IN THIS AREA. LIMESTONE  
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ATE BEDS MAY HAVE BEEN FAVORABLE HOSTS FOR ORE DEPOSITS.

PYROPHYLLITE DEPOSITS, EDGEFIELD COUNTY. -- BRIEF  
RECONNAISSANCE OF PYROPHYLLITE OCCURRENCES AT BOLES MOUNTAIN  
AND FAULKNER MOUNTAIN IN EDGEFIELD COUNTY SUGGESTS THAT THESE  
PROSPECTS ARE WORTHY OF THOROUGH EXPLORATION. SERICITE, PY-  
RITE, AND TOPAZ ACCOMPANY THE PYROPHYLLITE.

SAND, CAMP STYX PROPERTY, LEXINGTON COUNTY. --  
SEVERAL POWER AUGER HOLES ON STATE-OWNED LAND INDICATE THE  
PRESENCE OF LARGE DEPOSITS OF MEDIUM- TO COARSE-GRAINED SAND.

POOR MOUNTAIN, OCONEE COUNTY. -- SEVERAL DAYS GEOLOGIC MAPPING PROVIDED ADDITIONAL INFORMATION ON A SERIES OF AMPHIBOLITE, LIMESTONE, AND QUARTZITE BEDS.

LP GAS STORAGE. -- BRIEF RECONNAISSANCE INDICATES A SUITABLE AREA FOR AN UNDERGROUND CAVERN NEAR FOUNTAIN INN, GREENVILLE COUNTY, SOUTH CAROLINA.

GRAVEL HILL, BERKELEY COUNTY. -- SEVERAL DRILL HOLES IN THIS AREA INDICATE THAT THE GRAVEL DEPOSITS ARE PROBABLY THIN AND DISCONTINUOUS. THEY ARE THOUGHT TO HAVE BEEN DEPOSITED BY THE SANTEE RIVER DURING PLEISTOCENE TIME.

UPPER COASTAL PLAIN. -- A TWO DAY FIELD CONFERENCE ON SAND DEPOSITS AND GENERAL GEOLOGY OF THE UPPER COASTAL PLAIN WAS HELD BY B. F. BUIE (FLORIDA STATE UNIV.), JOHN HACK (USGS), GEORGE E. SIPLE (USGS), W. LARRY OTWELL (J. M. HUBER CORP.), AND H. S. JOHNSON, JR.

BLOATING CLAYS. -- BEDS OF BENTONITIC CLAY IN ORANGEBURG, CALHOUN, AND SUMTER COUNTIES WERE INVESTIGATED AND SAMPLED AS POSSIBLE SOURCES OF BLOATING CLAY FOR LIGHTWEIGHT AGGREGATE.

SAND, HORRY COUNTY. -- SEVERAL POTENTIALLY ECONOMIC SAND DEPOSITS WERE DRILLED IN HORRY COUNTY.

SINKHOLE, CALHOUN COUNTY. -- A POWER AUGER HOLE ON THE RIM OF A LARGE SINKHOLE NEAR FORT MOTTE ENCOUNTERED NO CALCAREOUS MATERIAL. THE SINKHOLE IS STILL UNEXPLAINED BUT MAY BE RELATED TO WEDGES OF SANTEE LIMESTONE INTERTONGUED WITH SANDS OF THE CONGAREE FORMATION.

SAND, HODGES PROPERTY, COLLETON COUNTY. -- SEVERAL DRILL HOLES ON THIS PROPERTY SUGGEST THAT THE SAND DEPOSITS ARE PROBABLY TOO THIN TO JUSTIFY DEVELOPMENT.

FLAGSTONE, RICHLAND COUNTY. -- BRIEF RECONNAISSANCE NEAR BLYTHEWOOD SUGGESTS THAT ROUGH FLAGSTONE AND PATIO STONE COULD PROBABLY BE PRODUCED FROM THE CAROLINA SLATE IN THIS AREA.

HARRISON GRANITE PROSPECT. -- AN ATTRACTIVE, RED GRANITE IS PRESENT ALONG THE EDGEFIELD-McCORMICK COUNTY LINE IN NORTHWEST EDGEFIELD COUNTY. THOUGH JOINTING AND VEINING IS RELATIVELY SEVERE, IT MAY BE POSSIBLE TO LOCATE SUITABLE MATERIAL FOR MONUMENTAL STONE.

MARY COPPER MINE, YORK COUNTY. -- A COPPER-BEARING QUARTZ VEIN UP TO 4 FEET THICK HAS BEEN EXPLORED TO A DEPTH OF ABOUT 40 FEET. THE COUNTRY ROCK IS GRANITE, AND THE VEIN APPEARS TO FILL A FAIRLY STRONG FRACTURE.

RESIDUAL KAOLIN, YORK COUNTY. -- BRIEF RECONNAISSANCE OF WEATHERED GRANITES HAS YET TO DISCOVER POTENTIALLY ECONOMIC KAOLIN DEPOSITS.

DRILLING, I-26 HIGHWAY. -- DRILLING ALONG THE HIGHWAY RIGHT-OF-WAY BETWEEN CHARLESTON AND ORANGEBURG HAS PROVIDED CONSIDERABLE INFORMATION ABOUT PLEISTOCENE AND MIOCENE DEPOSITS AND SEA LEVELS.

## REPORTS

DURING 1961 THE DIVISION OF GEOLOGY ISSUED THE FOLLOWING REPORTS:

BULLETIN 25, COMMON CLAYS OF THE COASTAL PLAIN OF SOUTH CAROLINA AND THEIR USE IN THE STRUCTURAL CLAY PRODUCTS INDUSTRY. THIS REPORT IS NOW AVAILABLE AT A COST OF \$1.00 PER COPY.

MS-3, GEOLOGY OF THE FORT JACKSON NORTH QUADRANGLE, SOUTH CAROLINA. PRICE 25¢.

MS-5, ECONOMIC MINERAL LOCALITIES OF SOUTH CAROLINA. PRICE 25¢.

MR-2, COMPILATION OF MINING LAWS OF SOUTH CAROLINA.

GEOLOGIC NOTES, THE BIMONTHLY PUBLICATION OF THE DIVISION OF GEOLOGY, CONTAINED THE FOLLOWING ARTICLES DURING 1961:

JANUARY-FEBRUARY  
VOL. 5 No. 1

GEOLOGIC ACTIVITIES IN S. C. DURING  
1960 - H. S. JOHNSON, JR.  
THE POWER AUGER AS A GEOLOGIC TOOL  
IN THE COASTAL PLAIN OF S. C. -  
L. N. SMITH.

MARCH-APRIL  
VOL. 5 No. 2

CHECK LIST OF DUPLIN (LATE MIOCENE)  
MOLLUSCAN SPECIES OF GEORGIA AND  
THE CAROLINAS - J. R. DU BAR AND  
J. R. SOLLIDAY.

MAY-JUNE  
VOL. 5 No. 3

NOTES ON RELATIONSHIPS OF PIEDMONT  
METASEDIMENTARY ROCKS WITH EM-  
PHASIS ON THE POOR MOUNTAIN -  
CHAUGA RIVER AREA, OCONEE COUNTY,  
S. C. - T. E. SHUFFLEBARGER, JR.  
GEOLOGIC RELATIONS INFERRED FROM THE  
PROVISIONAL GEOLOGIC MAP OF THE  
CRYSTALLINE ROCKS OF SOUTH CAROLINA  
- W. C. OVERSTREET AND HENRY BELL.

JULY-AUGUST  
VOL. 5 No. 4

WICOMICO SHORELINE IN ORANGEBURG,  
DORCHESTER, AND BERKELEY COUNTIES,  
SOUTH CAROLINA - D. J. COLQUHOUN.  
PIEZOMETRIC LEVELS IN THE CRETACEOUS  
SAND AQUIFER OF THE SAVANNAH  
RIVER BASIN - G. E. SIPLE.

SEPTEMBER-OCTOBER  
VOL. 5 No. 5

CAROLINA GEOLOGICAL SOCIETY GUIDEBOOK  
FOR MEETING OCTOBER 21-22, 1961. -  
RELATIONSHIPS BETWEEN THE CAROLINA  
SLATE BELT AND THE CHARLOTTE BELT  
IN NEWBERRY COUNTY, SOUTH CAROLINA -  
J. F. MCCAULEY.  
FALL LINE STRATIGRAPHY NORTHEAST OF  
COLUMBIA, S. C. - H. S. JOHNSON, JR.

NOVEMBER-DECEMBER  
VOL. 5 No. 6

NOTES ON THE GEOLOGY AND STRUCTURE OF  
OCDNEE COUNTY, S. C. - C. J. CAZEAU  
HISTORIC MAP LINKS PROGRESS IN GEOLOGY -  
L. L. SMITH  
COMMON CLAYS OF THE COASTAL PLAIN OF  
S. C. - G. C. ROBINSON, B. F. BUIE,  
AND H. S. JOHNSON, JR. (ABSTRACT)  
GEOLOGY OF THE FORT JACKSON NORTH  
QUADRANGLE, S. C. - W. K. PODSER  
AND H. S. JOHNSON, JR. (ABSTRACT).



# NEWLY DEVELOPED SINKHOLES IN HORRY COUNTY, SOUTH CAROLINA

By

OTTIE G. JOHNSON<sup>1/</sup>

TWO NEWLY DISCOVERED SINKHOLES (PLATE 1) DEVELOPED IN THE EXTREME NORTHWESTERN CORNER OF HORRY COUNTY IN JULY OR AUGUST, 1961. THESE TWO HOLES ARE CIRCULAR WITH VERTICAL WALLS. ONE IS APPROXIMATELY 40 FEET IN DIAMETER, HAS A VERTICAL WALL 6 FEET DEEP, AND HAS A CONE SHAPED BOTTOM. THE TOTAL DEPTH IS APPROXIMATELY 8 FEET IN THE CENTER. THE OTHER HOLE IS ONLY 30 FEET IN DIAMETER, HAS A 4 FEET DEEP VERTICAL WALL, AND A TOTAL DEPTH OF 6 FEET. THESE TWO SINKHOLES HAD PARTIALLY FILLED AT THE TIME OBSERVATIONS WERE MADE. A THIRD SINK IS PRESENT IN THE SAME AREA BUT IT IS ONLY A SMALL DEPRESSION.

THESE SINKHOLES OCCURRED IN AN OPEN FIELD OWNED BY W. F. HAMMOND WHICH IS LOCATED 1.1 MILES NORTHWEST OF U. S. HIGHWAY 76, 3.4 MILES EAST FROM WHERE IT INTERSECTS WITH SOUTH CAROLINA HIGHWAY 9, 2 MILES EAST OF NICHOLS, S. C. THE FIELD HAS BEEN IN CULTIVATION THE PAST 80 TO 90 YEARS. ONE SUCH SINKHOLE OCCURRED IN THE SAME AREA DURING THE SUMMER OF 1945 AND WAS FILLED IN. ITS EXACT LOCATION HAS SINCE BEEN LOST.

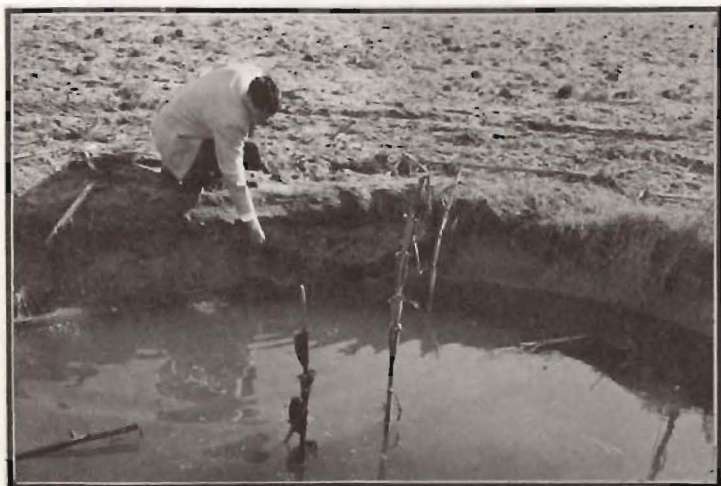
THE AREA IN WHICH THESE SINKHOLES ARE LOCATED IS COMMONLY CALLED THE GAPWAY SWAMP. IT IS MAPPED AS THE SNOW HILL MARL MEMBER OF THE UPPER CRETACEOUS BLACK CREEK FORMATION. THE WATER TABLE WILL VARY FROM 1 TO 4 FEET BELOW THE GROUND SURFACE DURING THE YEAR. IT IS ASSUMED THAT CAVITIES HAVE FORMED IN THE MARL AND THAT THE SINKHOLES WERE FORMED FROM THE CAVING OF THESE CAVITIES. A CLOSER EXAMINATION IS NEEDED FOR A MORE ACCURATE DESCRIPTION OF THE CAUSE.

SINKHOLES ARE COMMON IN YOUNGER FORMATIONS NEARER THE COAST BUT THEY ARE RARE IN THIS AREA OF SOUTH CAROLINA.

<sup>1/</sup> GEOLOGIST, SOIL CONSERVATION SERVICE, COLUMBIA, SOUTH CAROLINA



A. SINKHOLE AS IT APPEARED IN JANUARY 1962.



B. POINTING OUT BURIED TOPSOIL LAYER INDICATING  
SMALL SINKS IN THE PAST.

# A NEGLECTED GEOLOGIC MAP OF SOUTH CAROLINA<sup>1/</sup>

By

WILLIAM C. OVERSTREET<sup>2/</sup> AND HENRY BELL, III<sup>3/</sup>

## ABSTRACT

A MULTICOLOR GEOLOGIC MAP OF THE STATE OF SOUTH CAROLINA AT A SCALE OF 1 INCH EQUALS 10 MILES WAS PUBLISHED IN 1883 BY HARRY HAMMOND IN A VOLUME TITLED "SOUTH CAROLINA. RESOURCES AND POPULATION, INSTITUTIONS AND INDUSTRIES." THE MAP IS LARGELY UNKNOWN TO GEOLOGISTS. IT HAS NOT BEEN LISTED IN STANDARD BIBLIOGRAPHIES OF NORTH AMERICAN GEOLOGY NOR SHOWN ON INDICES OF GEOLOGIC MAPPING IN SOUTH CAROLINA. IT WAS QUITE GOOD FOR ITS TIME AND IS STILL USEFUL FOR REVIEWS OF REGIONAL GEOLOGY.

## INTRODUCTION

A MULTICOLOR GEOLOGIC MAP OF THE STATE OF SOUTH CAROLINA AT A SCALE OF 1 INCH EQUALS 10 MILES WAS PUBLISHED BY HARRY HAMMOND IN 1883 IN A LENGTHY VOLUME TITLED "SOUTH CAROLINA. RESOURCES AND POPULATION, INSTITUTIONS AND INDUSTRIES" (HAMMOND, 1883). THE GEOLOGIC MAP APPEARS TO HAVE REMAINED LARGELY UNKNOWN TO GEOLOGISTS, BECAUSE IT HAS NOT BEEN LISTED BY J. M. NICKLES (1923), NOR INDEXED BY LEONA BOARDMAN (1950), NOR DESCRIBED BY H. S. JOHNSON, JR. (1959, P. 5-6). IN FACT, THE ONLY REFERENCE WE HAVE FOUND TO THE MAP IN THE GEOLOGIC LITERATURE IS PASSING MENTION BY G. H. WILLIAMS (1894, P. 30) OF A GEOLOGIC MAP OF SOUTH CAROLINA PUBLISHED BY THE STATE DEPARTMENT OF AGRICULTURE. WILLIAMS DID NOT FURTHER IDENTIFY IT. BECAUSE THE MAP HAS BEEN NEGLECTED, THOUGH IT WAS QUITE GOOD FOR THE TIME IT WAS PUBLISHED AND IS STILL USEFUL IN REVIEWS OF REGIONAL GEOLOGY, WE HAVE PREPARED THIS NOTE TO CALL ATTENTION TO IT.

## THE MAP

THE TITLE IS "MAP OF THE STATE OF SOUTH CAROLINA ISSUED BY THE DEPARTMENT OF AGRICULTURE OF SOUTH CAROLINA 1883. A. P. BUTLER COMMISSIONER, COLUMBIA, S. C." NO REFERENCE IS MADE ON THE MAP TO THE COMPILER, HARRY HAMMOND. WERE IT NOT FOR HIS PREFACE TO HIS VOLUME ON THE RESOURCES OF SOUTH CAROLINA, IN WHICH HE STATES HE PREPARED THE GEOLOGIC MAP, THERE WOULD BE NO WAY TO KNOW WHO COMPILED IT.

<sup>1/</sup> PUBLICATION AUTHORIZED BY THE DIRECTOR, U. S. GEOLOGICAL SURVEY

<sup>2/</sup> U. S. GEOLOGICAL SURVEY, BELTSVILLE, MARYLAND

<sup>3/</sup> U. S. GEOLOGICAL SURVEY, BELTSVILLE, MARYLAND

THE GEOLOGIC MAP WAS DRAWN, ENGRAVED, AND PRINTED IN 1883 BY C. W. AND C. B. COLTON AND CO., 182 WILLIAM STREET, NEW YORK. IT IS FOLDED INTO THE BACK OF HAMMOND'S REPORT ON THE RESOURCES OF SOUTH CAROLINA, WHICH WAS PRINTED AT CHARLESTON, S. C., BY WALKER, EVANS, AND COGSWELL, NOS. 3 BROAD AND 109 EAST BAY STREETS.

THE BASE IS 24 $\frac{1}{2}$ "x33" AT THE OUTER NEAT LINE. IT IS A BLACK-LINE PLANIMETRIC MAP OF THE STATE WITH HACHURES INTRODUCED IN THE EXTREME NORTHWEST TO DEFINE THE MOUNTAINS. THE BASE SHOWS STREAMS, TOWNS, COUNTIES, TOWNSHIPS, ROADS, RAILROADS (IN OPERATION AND PROPOSED), GEOLOGIC CONTACTS, AND THE DISTRIBUTION OF MINERAL DEPOSITS. DEPOSITS INDEXED ON THE MAP INCLUDE GOLD, COPPER, LEAD, SILVER, IRON, MANGANESE, GRAPHITE, ZIRCON, FELDSPAR, CORUNDUM, BARITE, ASBESTOS, SOAPSTONE, MICA, KADLIN, MARBLE, BROWN COAL, AND BISMUTH. IN THE MARGINS OF THE SHEET SIX CROSS SECTIONS AND A GEOLOGIC COLUMN ARE GIVEN.

THE GEOLOGICAL FEATURES SHOWN ON THE MAP WERE COMPILED FROM THE WORK OF EDMUND RUFFIN (1843, 1844, 1861), MICHAEL TUOMEY (1844, 1848), O. M. LIEBER (1858A, 1858B, 1859, 1860), AND C. U. SHEPARD (1869, 1871) WITH HEED TO W. C. KERR'S GEOLOGICAL SURVEY OF NORTH CAROLINA (KERR, 1875).

THE GEOLOGIC COLUMN USED BY HAMMOND SHOWS 23 UNITS AS FOLLOWS:

QUARTERNARY(SIC)	POST PLIOCENE	FRESH WATER SWAMP SALT MARSH COAST REGION
	PLIOCENE	NORTHERN LIMIT OF PLIOCENE MARLS
		PHOSPHATE ROCK NORTHERN LIMIT OF ASHLEY AND COOPER MARLS
CAENOZOIC	EOCENE	NORTHERN LIMIT OF SANTEE MARLS
		NORTHERN LIMIT OF BUHRSTONE
		LOWER PINE BELT
		UPPER PINE BELT
		RED HILL REGION
		SAND HILL REGION
MESOZOIC	CRETACEOUS	NORTHERN LIMIT OF CRETACEOUS MARLS
		LIMESTONE AND MARBLE
		SILICEOUS ROCKS
		ITACOLUMITE
		SANDSTONE
		HORNSTONE
ARCHAEAN	HURONIAN	QUARTZILIC SCHIST (SIC)
		CLAY SLATE
		TALC SLATE
		MICA SLATE

	UPPER	HORNBLLENDE SLATE
	LAURENTIAN	GNEISS
	LOWER	GRANITE
AZOIC	IGNEOUS	STEATITE
		TRAPP AND PORPHYRIES

EACH OF THE FIVE UNITS INTRODUCED IN THE COLUMN BY THE PHRASE "NORTHERN LIMIT OF . . ." IS BOUNDED BY A DISTINCTIVE LINE. THE REMAINING 18 UNITS ARE SHOWN BY ATTRACTIVE COLORS. BRUSH MARKS, SLIGHT SHADING AT CONTACTS, AND MINOR VARIATIONS IN HUE INDICATE THAT THESE ARE WATER COLORS PUT ON BY HAND. THE THREE COPIES OF THE MAP WE HAVE SEEN WERE COLORED, BUT UNCOLORED COPIES SEEM TO HAVE BEEN ISSUED. SEVERAL KINDS OF ECONOMIC AND DEMOGRAPHIC MAPS WERE PRINTED ON THE SAME BASE USED FOR THE GEOLOGIC MAP (H. S. JOHNSON, JR., WRITTEN COMMUNICATION, 1961), BUT ONLY THE MULTICOLOR GEOLOGIC MAP ACCOMPANIES COPIES WE HAVE SEEN OF THE VOLUME "SOUTH CAROLINA. RESOURCES AND POPULATION, INSTITUTIONS AND INDUSTRIES."

THE DEFICIENCIES BY PRESENT STANDARDS OF THE GEOLOGIC COLUMN NEED NOT DETER ONE FROM A STUDY OF THE MAP ITSELF, BECAUSE IT CONTAINS MUCH USEFUL DATA ABOUT THE DISTRIBUTION OF ROCKS IN SOUTH CAROLINA. THE MAP WAS A SIGNIFICANT CONTRIBUTION AT THE TIME IT WAS PUBLISHED. IT IS SURPRISING THAT SUBSEQUENTLY SO LITTLE USE WAS MADE OF IT IN THE GEOLOGIC PROFESSION.

#### THE AUTHOR

THE BIOGRAPHY OF HARRY HAMMOND FOLLOWING IS PARAPHRASED FROM NOTES PREPARED BY MEMBERS OF THE SOUTH CAROLINA ARCHIVES DEPARTMENT AND SENT TO US BY ITS DIRECTOR, C. E. LEE. THE SOURCES ARE ROLAND HAMMOND (1894, P. 270), OLIPHANT AND DUNCAN (1954, P. 87), AND THE EDITION OF JANUARY 8, 1916 OF THE STATE, COLUMBIA, SOUTH CAROLINA.

HARRY HAMMOND WAS BORN ON MARCH 30, 1832, THE ELDEST SON OF J. H. HAMMOND, SENATOR AND GOVERNOR OF SOUTH CAROLINA. HARRY HAMMOND GRADUATED FROM SOUTH CAROLINA COLLEGE IN 1852 AND FROM THE MEDICAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA IN 1855. HE TRAVELLED IN EUROPE DURING 1856-57. HE HELD THE POSITION OF PROFESSOR OF NATURAL SCIENCES AT FRANKLIN COLLEGE (NOW THE UNIVERSITY OF GEORGIA) IN 1859-60. HE ENTERED THE FOURTEENTH REGIMENT, SOUTH CAROLINA VOLUNTEERS IN OCTOBER 1861, AND IN 1862 WAS MADE MAJOR IN GENERAL MAXCY GREGG'S (AFTERWARDS MCGOWAN'S) BRIGADE. HE SERVED WITH THE ARMY OF NORTH VIRGINIA UNTIL PAROLED AT APPOMATTOX COURT HOUSE IN 1865. THEREAFTER HE WAS A PLANTER AT RED CLIFFE, BEECH ISLAND, SOUTH CAROLINA. IT WAS THERE THAT HE PREPARED "SOUTH CAROLINA. RESOURCES AND POPULATION, INSTITUTIONS AND INDUSTRIES" AND ITS ACCOMPANYING GEOLOGIC MAP. AS FAR AS CAN BE DETERMINED HE PREPARED NO OTHER GEOLOGIC REPORTS. HARRY HAMMOND DIED JANUARY 7, 1916.

## ACKNOWLEDGEMENTS

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